I HEREBY CERTIFY THAT THIS CORRESPONDENCE IS BEING DEPOSITED WITH THE UNITED STATES POSTAL SERVICE AS FIRST CLASS MAIL IN AN ENVELOPE ADDRESSED TO: COMMISSIONER FOR PATENTS, P.O. BOX 1450, ALEXANDRIA, VA 22313-1450, ON THE DATE INDICATED BELOW.

By: Louisa Drain Date: July 26, 2004

MAIL STOP APPEAL BRIEF - PATENTS

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Patent Application of: Stephen Nicholas Weiss *et al.*			
Conf. No.:	1622	Group Art Unit:	3713
Appln. No.:	10/046,374	Examiner:	Aaron L. Enatsky
Filing Date:	January 14, 2002	Attorney Docket No.:	4110-183/165U1

Title: COMMUNICATION SYSTEM FOR RADIO CONTROLLED TOY VEHICLE

APPEAL BRIEF TRANSMITTAL LETTER

Enclosed are the following:

[X]	Appellant's Brief Under 37 C.F.R. § 1.192, in triplicate;	
[ ]	A Petition for Extension of time with requisite fee;	
[X]	A check in the amount of **$330.00** to cover the filing fee.	
[X]	The Commissioner is hereby authorized to charge Deposit Account No. 50-1017 (Billing No. 204110.0183) as noted below. An additional copy is enclosed.	
	[ ]	Appellant's Brief fee in the amount of [$165.00/$330.00].
	[X]	Any deficiencies or overpayments in the above-calculated fee.

Respectfully submitted,

STEPHEN NICHOLAS WEISS *ET AL.*

July 26, 2004
(Date)

By: [signature]

LOUIS SICKLES II
Registration No. 45,803
AKIN GUMP STRAUSS HAUER & FELD LLP
One Commerce Square
2005 Market Street, Suite 2200
Philadelphia, PA 19103-7013
Telephone: 215-965-1200
Direct Dial: 215-965-1294
Facsimile: 215-965-1210
E-Mail: lsickles@akingump.com

LS/lcd
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I HEREBY CERTIFY THAT THIS CORRESPONDENCE IS BEING DEPOSITED WITH THE UNITED STATES POSTAL SERVICE AS FIRST CLASS MAIL IN AN ENVELOPE ADDRESSED TO: COMMISSIONER FOR PATENTS, MAIL STOP APPEAL BRIEF – PATENTS, P.O. BOX 1450, ALEXANDRIA, VA 22313-1450, ON THE DATE INDICATED BELOW.

By: Lorisa Drain Date: July 26, 2004

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Commissioner for Patents

Alexandria, VA 222313-1450

Attention: Board of Patent Appeals and Interferences

APPELLANT'S BRIEF (37 C.F.R. § 1.192)

This brief is in furtherance of the Notice of Appeal, filed in this case on May 24, 2004.

The fees required under § 1.17 are dealt with in the accompanying TRANSMITTAL OF APPEAL BRIEF.

This brief is transmitted in triplicate. (37 C.F.R. § 1.192(a)).

This brief contains these items under the following headings, and in the order set forth below (37 C.F.R. § 1.192(c)).

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TABLE OF CONTENTS

The page following the Appendix of Claims Involved in the Appeal bears the practitioner's signature.

I. REAL PARTY IN INTEREST (37 C.F.R. § 1.192(c)(1))

The real party in interest in this appeal is Mattel, Inc.

II. RELATED APPEALS AND INTERFERENCES (37 C.F.R. § 1.192(c)(2))

There are no appeals or interferences that will directly affect, or be directly affected by, or have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS (37 C.F.R. § 1.192(c)(3))

A. Status Of All The Claims

1. Claims pending: 1-12
2. Claims allowed: NONE
3. Claims rejected: 1-12
4. Claims objected to: NONE

B. Claims On Appeal

The claims on appeal are: 1-12

IV. STATUS OF AMENDMENTS (37 C.F.R. § 1.192(c)(4))

Amendments to claims 1 and 12, filed subsequent to final rejection, have been entered.

V. SUMMARY OF THE INVENTION (37 C.F.R. § 1.192(c)(5))

The following summary is provided without any intention to limit the scope of the claims. The subject matter of claims 1-12 is summarized below.

Claim 1 recites a communication system for transmitting control signals from a remote control unit to a toy vehicle. The remote control unit (described at page 6, line 19 to page 8, line 21 and shown in Fig. 2) includes control switches 220, an encoder 212 and a transmitter 224. The toy vehicle (described at page 8, line 22 to page 10, line 9 and shown in Fig. 3) includes a receiver 312, 314, 316, a decoder 322 and actuators 328, 342, 336 for controlling the operation of the toy vehicle in accordance with control signals received from the remote control unit.

In the communication system, the encoder generates a continuous stream of control signal packets (page 4, lines 25-27 and Fig. 1). Each of the packets includes a predetermined number of biphase encoded bits, with each biphase encoded bit being of the same predetermined width, a fifty percent duty cycle and including two transmit elements (page 4, line 27- page 5, line 1). One binary state is defined as both of the transmit elements of a bit being the same and the other binary state is defined as both of the transmit elements of a bit being opposite (page 5, lines 2-9). Each packet includes a first predetermined number of flag bits which are the same for all packets, a second predetermined number of data bits whose states vary depending upon the positions of the control switches and at least one checksum bit (page 5, line 10 to page 6, line 4) .

Claim 2 recites that a binary "zero" is defined as both transmit elements being the same and a binary "one" being defined as both transmit elements being opposite (page 5, lines 4-9).

Claim 3 recites that each packet includes sixteen bits (page 5, lines 10-11)

Claim 4 recites that the number of flag bits is six (page 5, lines 10-11).

Claim 5 recites that the number of data bits is eight (page 5, lines 22-23).

Claim 6 recites that of the number data bits, three are used for drive functions and three are used for steering functions (page 5, lines 22-25).

Claim 7 recites that of the number of data bits, two are used for controlling additional toy functions (page 5, lines 25-26)

Claim 8 recites that the checksum bits are determined by adding together the ones of the data bits and using the lower two bits of the sum (page 5, lines 16-18).

Claim 9 recites that the flag bits are at the leading edge of each packet and are followed by the checksum bits and the data bits (page 5, lines 10-23).

Claim 10 recites that each bit is read at the middle of each transmit element (page 10, lines 17-19).

Claim 11 recites that the decoder comprises a microprocessor (page 9, lines 16-21).

Claim 12 recites that the receiver includes a digital phase locked loop (page 10, line 17 to page 11, line 4).

The claimed invention improves the responsiveness of controlling a toy vehicle having a large number of controllable functions by transmitting a continuous (uninterrupted) stream of data packets, each of which contains only 16 bits for representing all of the control functions of the toy vehicle.

VI. ISSUES (37 C.F.R. § 1.192(c)(6))

1. Whether claims 1-11 are unpatentable under 35 U.S.C. §103(a), as being obvious over U.S. Patent No. 4,334,221 to Rosenhagen (hereafter "Rosen") in view of U.S. Patent No. 6,151,318 to Woodward et al. (hereafter "Wood").

2. Whether claim 12 is unpatentable under 35 U.S.C. § 103(a) as being obvious over Rosen in view of Wood and further in view of The Art of Electronics (hereafter AE).

VII. GROUPING OF CLAIMS (37 C.F.R. § 1.19(c)(7))

The following are groupings of the claims on appeal:

1. Claim 1, 2, 11;
2. Claim 5;
3. Claim 6;
4. Claim 7;
5. Claim 8;
6. Claim 3;
7. Claim 4;
8. Claim 9;
9. Claim 10; and
10. Claim 12.

The claims are being addressed slightly out of order because the inadequacy of the bases

for rejecting claims 3 and 4 are best appreciated by addressing the rejections of claims 5-8 first. The reasons for patentability are set forth below.

VIII. ARGUMENTS UNDER 35 U.S.C. § 103 (37 C.F.R. 1.19(c)(8)(iv))

A. Background to the Presently Claimed Invention

The present invention provides a communication system having a data encoding scheme which overcomes many of the problems of prior art encoding schemes, particularly when used in connection with controlling a toy vehicle having a large number of controllable functions. With the present communication system, command packets consist of only 16 bits and each command packet is transmitted immediately following the preceding packet. By minimizing the number of bits in each command packet and by transmitting the command packets continuously and uninterruptedly one right after the other, the time delay for transmitting a new command is minimized, resulting in improved responsiveness of the toy vehicle and reduced likelihood of an occurrence of radio noise during the data transmission. Further, the encoding scheme employed in the present communication system utilizes biphase encoded bits (50% duty cycle) with the bits being read at the middle of each transmit element, resulting in an increased communication distance and a decreased potential for decoding transient or erroneous data. Finally, the present invention employs a digital phase-locked loop to provide enhanced synchronization with a reduced likelihood of erroneous data being read.

B. Description of references applied to the present invention by the Examiner

1. Rosenhagen et al (Rosen)

Rosen is directed to a radio control system for a multi-controller, multi-vehicle, independently controlled toy vehicle system (Abstract). Each of the controllers repetitively transmits low duty cycle command bursts containing a vehicle code and vehicle commands. The separate controllers transmit the command bursts asynchronously (i.e. with different repetition periods). The combination of the low duty cycle and the asynchronous transmissions between the controllers results in a high probability of non-interference between the transmissions of the controllers.

2. Woodward et al. (Wood)

Wood discloses a system for encapsulating asynchronous transfer mode (ATM) cells into larger data packets for satellite transmission. As is well known, ATM cells are 53 bytes (424 bits) long and are generated (received) asynchronously. As described at col. 1, lines 12-34 of Wood, broadband satellite channels generally use data packet lengths greater than 53 bytes. Accordingly, there is a mismatch between both the size and timing of the ATM and satellite data packets.

According to Wood, when transmitting ATM cells over satellite links, it is desirable to fully utilize the channel capacity. Consequently, Wood describes a buffer/formatter (Fig. 4) which is capable of receiving ATM cells arriving at the buffer/formatter asynchronously from multiple sources and encapsulating them into successive satellite data packets so as to maximally utilize the available satellite bandwidth. Each satellite data packet comprises an additional header segment, a fragment type segment, and a payload segment into which two or more of the received ATM cells are encapsulated.

As described in the paragraph at col. 3, lines 7-30, ATM cells (tantamount to the control packets as described by Rosen) may flow in a continuous stream or may have variable time gaps between them. (col. 3, lines 23-26). In the case where the ATM cells are temporally spaced apart, Wood teaches placing successive ATM cells into separate satellite data packets (col. 3, lines 24-26). Thus, the ATM cells are not transmitted immediately following each other in time within a single satellite packet except when they arrive sequentially from a single ATM source with no intervening cells. Further, as shown in Figs. 2 and 3, even when the ATM cells arrive continuously from a single ATM source, where the quantity of the ATM cells exceeds the size of a satellite data packet payload segment (2 ATM cells), the ATM cells are placed in the payload segments of successive satellite data packets. Since each satellite data packet has additional header and fragment type segments preceding each payload segment, <u>the ATM packets can not immediately follow each other in time</u>, as they will always be separated by at least the additional header information and fragment type segments. Since, as stated at col. 4, lines 11-22, typical numbers of packets "are measured in the millions", discontinuities in the transmission of the ATM cells (control packets) would be the norm.

3. <u>The Art of Electronics</u>

The Art of Electronics teaches the principles of phase locked loops and their application to pulse synchronization.

C. Patentability of Claims 1-12 Over the Applied References

BECAUSE THE U.S. PATENT AND TRADEMARK OFFICE (PTO) HAS NOT MET ITS BURDEN UNDER § 103 TO ESTABLISH A *PRIMA FACIA* CASE OF OBVIOUSNESS, CLAIMS 1-12 MUST BE FOUND PATENTABLE OVER ROSENHAGEN (hereafter ROSEN) ET AL. IN VIEW OF WOODWARD ET AL. (hereafter WOOD).

1. Patentability of Claims 1, 2 and 11.

a. THE EXAMINER ERRED IN REJECTING CLAIMS 1, 2 AND 11 OVER THE COMBINATION OF ROSEN AND WOOD BECAUSE WOOD IS NON-ANALOGOUS ART.

"In order to rely on a reference as a basis for rejection of an Appellants' invention, the reference must either be in the field of Appellants' endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned." *MPEP Rev. 2 § 2141(a)*, page 2100-122, May 2004, *In re Oetiker*, 977 F.2d 1443, 1446, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992).

The United States Patent and Trademark Office states in the MPEP that classification of references is some evidence of nonanalogy or analogy but that similarities and differences in structure and function of the inventions carry more weight.

The United States Patent and Trademark Office (USPTO) has classified the present invention in U.S. Class 446, Amusement Devices: Toys. Rosen is classified in U.S. class 340, Communications: Electrical. Wood has is classified in class 370, Multiplex communications. Clearly, the USPTO has not classified the present invention in the same fields as either of the references Rosen and Wood nor have Rosen and Wood been classified together.

Appellants do not dispute that Rosen would be analogous prior art Rosen being a communications system related to simultaneously controlling multiple toy vehicles. However, Appellants submit that Wood would not be pertinent to the inventor's problem because the structure and function of Wood are far different than the present invention and the field of the present invention. As recognized by the USPTO, Wood discloses a multiplexing system for broadband satellite transmission and not a communication system for a toy vehicle. More specifically, the function of Wood is encapsulating irregularly generated ATM cells from multiple ATM sources into larger data packets for optimization of broadband data transmission and is not the function of transmitting control signals simultaneously from several apparently

identical single sources to several separate vehicles (Rosen) or even from a single such source to a single toy vehicle (present invention).

Further the structure of the present invention is far different than the multiplexer disclosed by Wood. The present invention is a single frequency communication system utilizing a relatively simple data structure suitable for economical implementation in a toy vehicle control system. Wood is a highly sophisticated, multiplex system disclosed in the context of broadband, multiple channel, data communications using sophisticated data protocols such as ATM. Further, Appellants submit that the reference Wood would not have commended itself to the inventors attention in considering the problem of communicating commands to a toy vehicle over a single channel communication link because: (1) the buffer control taught by Wood is irrelevant to inventor's problem and (2) because the complexity of the method and structure taught by Wood is inappropriate to the control of a toy vehicle. Accordingly, the Examiner has no basis for even trying to combine Rosen and Wood to reject the present claims.

b. THE EXAMINER ERRED IN REJECTING CLAIMS 1, 2 AND 11 OVER THE COMBINATION OF ROSEN AND WOOD BECAUSE THE PROPOSED MODIFICATION OF ROSEN BY WOOD WOULD IMPERMISSIBLY RENDER ROSEN'S INVENTION UNSATISFACTORY FOR ITS INTENDED PURPOSE.

"If the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification." *MPEP 2143.01*, *rev. 2*, § 2143.01, page 2100-131 to page 2100 132, May 2004, *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir 1984).

Rosen is directed to a radio control system for a multi-controller, multi-vehicle, independently controlled toy vehicle system (Abstract). Each of a plurality of controllers repetitively and asynchronously transmits low duty cycle command bursts whereby mutual overlap of command bursts from the plurality of controllers is reduced. Rosen expressly states: "The duty ratio of ON time to OFF time should be less than ten percent and preferably less than five percent." (see col. 4, lines 52-54). [Emphasis added.]

Rosen specifically relies on a low duty cycle along with asynchronous transmissions to minimize interference between the controller transmissions. If the transmissions from each controller were continuous, as proposed by the Examiner, the simultaneous transmissions from each of the controllers would cause substantial mutual interference and result in errors in the

decoding of the transmissions by the receivers in the toy vehicles. Indeed, the Examiner's proposed change would take Rosen to or closer to the prior art system that Rosen was avoiding.

Further, the modification of Rosen suggested by the Examiner on pages 2 and 5 of the Office Action, to transmit a continuous stream of packets without intervening quiescent periods, would be in direct opposition to Rosen's stated objective of avoiding the mutual interference (col. 1, lines 35-39).

The modification of Rosen by Wood would render the invention of Rosen unsatisfactory for its intended use of simultaneously yet independently controlling multiple vehicles from the plurality of control sets at the same frequency. In effect, Rosen teaches away from the proposed modification, *Id.* 221 USPQ at page 1127. Accordingly, Rosen cannot be modified as the Examiner has proposed, regardless of the other art cited, as the modification to Rosen being proposed in order to read on claim 1 renders Rosen unsatisfactory for its intended purposes.

c. THE EXAMINER ERRED IN REJECTING CLAIMS 1, 2 AND 11 OVER THE COMBINATION OF ROSEN AND WOOD BECAUSE THE ELEMENTS OF ROSEN WOULD REQUIRE SUBSTANTIAL RECONSTRUCTION AND A CHANGE IN WOOD'S PRINCIPLE OF OPERATION IN ORDER FOR THE COMBINATION TO TEACH ALL THE LIMITATIONS OF CLAIM 1.

It is not a proper ground for rejection if the "suggested combination of references would require a substantial reconstruction of [the primary reference] as well as the basic principle under which the [primary reference] was designed to operate." *MPEP Rev.2*, § 2143.01, page 2100-132, May 2004; *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959).

Rosen is directed to a radio control system which is specifically designed for a multi-controller, multi-vehicle independently controlled toy vehicle system (Abstract). As disclosed by Rosen, each of a plurality of control sets repetitively and asynchronously transmits low duty cycle command bursts using the identical radio frequency, whereby mutual overlap of command bursts from the plurality of control sets is minimized. Long quiescence is an integral part of the Rosen invention (Rosen col. 1, line 65 – col. 2, line 1; col. 4, lines 52-54; claims 3-7). The Examiner states that Rosen could still control a single vehicle by transmitting low duty cycle bursts that would discontinuously follow one another. As the Examiner notes, there is nothing then to prevent those of ordinary skill in this art from going back to the known formats and

designs which gave rise to the interference problem Rosen is addressing. Nothing in the art relied upon or cited indicates a necessity or even a desirable reason to transmit toy vehicle control signals continuously and uninterruptedly as claimed. The mere fact Rosen can be modified (or combined) is not sufficient to establish *prima facie* obviousness. MPEP § 2143.01.

Furthermore, in order to be able to combine Rosen and Wood, the combination must <u>not</u> require substantial reconstruction and redesign of the elements shown in Rosen and must not require a substantial change of the basic principles under which the Rosen construction was designed to operate, *Id.* at 352; MPEP § 2143.01. As pointed out in subsection b. above, the modification being proposed by the Examiner renders Rosen unsatisfactory for its intended purpose. This is because the Examiner proposes to change the principle of operation of Rosen.

The Examiner's proposed change would also require a substantial reconstruction of Rosen. Claim 1 recites an encoder generating a continuous, uninterrupted stream of control signal packets which are continuously transmitted, with each control signal packet immediately following the preceding packet, and each packet including a predetermined number of biphase encoded bits. The term "continuous" is defined as "marked by uninterrupted extension in space time or sequence", in <u>Merriam-Webster's Collegiate Dictionary</u>, Tenth Edition, page 251. The method of transmission whereby signal packets are transmitted continuously, and the sending and receiving terminals are operating at the same rate, is commonly referred to as synchronous transmission, <u>IEEE 100, The Authoritative Dictionary of IEEE Standard Terms</u>, Seventh Edition, page 1141. The use synchronous communications by the preferred embodiment is further evidenced by the use of a phase locked loop to control the clocking of the received signal in the receiver/decoder.

Rosen is described as transmitting command bursts asynchronously (Abstract). Each burst includes a "start pulse" for synchronizing the receiver to each transmitter burst (col. 5, lines 62-63). The use of a "start pulse" is clear evidence that Rosen employs classical asynchronous communication for communicating information from the controllers to the toy vehicles. It is clear to those skilled in the art that the modification proposed by the Examiner would require substantial reconstruction and redesign of both Rosen's transmitters and the receivers to provide a synchronous communications capability instead of the disclosed asynchronous communications. Further, as discussed above, the change from asynchronous to synchronous communications would completely change Rosen's principle of operation, which purposely

utilizes a low duty cycle to avoid interference. Accordingly, the combination Rosen and Wood is further unsupported on these grounds.

d. THE EXAMINER ERRED IN REJECTING CLAIMS 1, 2 AND 11 OVER THE COMBINATION OF ROSEN AND WOOD BECAUSE THERE IS NO ACTUAL TEACHING OR SUGGESTION IN THE REFERENCES TO MAKE THE MODIFICATION SUGGESTED BY THE EXAMINER

"Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art." *MPEP*, Rev 2, *§ 2143.01,* page 2100-130, May 2004, *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596, 1598, (Fed. Cir. 1988).

Rosen teaches a communication system in which control signals are transmitted asynchronously with a low duty cycle. Wood teaches a method of multiplexing appropriate to encapsulating packets of one length in packets of a different length. There is no teaching or suggestion in Rosen to utilize an uninterrupted stream of control packets for communication between the control set and the vehicle as the Examiner represents. Neither is there any teaching or suggestion in Wood to apply the data multiplexing/encapsulation technique to the control signals of toy vehicles particularly where such signals are being broadcast wirelessly so they will interfere when transmitted to the multiplexer and again when the multiplexer retransmits those signals to the vehicles.

If there is any teaching or suggestion from Wood, it is to provide a buffer between the individual control sets and the vehicles to receive and assemble the asynchronously arriving control packets from the plurality of control sets in order to broadcast bundles of the control packets to the vehicles. The actual suggestion of Wood is unrelated to the claimed invention and irrelevant to Appellants' problem and solution. Even if there were justification for the combination, the specific combination proposed by the Examiner still does not satisfy the claim language. The original transmitters of Rosen would continue to transmit asynchronously (like the ATM cells of Wood) and the bundles of control packets would be broadcast discretely and asynchronously as the individual bundles were assembled. Accordingly, the modification cited by the Examiner is not a modification taught or suggested in by the references themselves and the cited combination Rosen and Wood is further unsupported on this ground.

e. THE EXAMINER ERRED IN REJECTING CLAIMS 1, 2 AND 11 OVER THE COMBINATION OF ROSEN AND WOOD BECAUSE THE CITED COMBINATION OF ROSEN AND WOOD STILL DOES NOT TEACH OR SUGGEST ALL THE ELEMENTS OF CLAIM 1.

"To establish prima facia obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art." *MPEP Rev 2*, § 2143.03, page 2100-133, May 2004; *In Re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974).

The Examiner stated in the Office Action dated August 26, 2003 that Rosen does not teach an uninterrupted stream of control packets but Wood teaches a packet delivery system using a continuous stream of packets and it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Rosen with the uninterrupted packet stream taught by Wood. The Examiner repeated the rejection in the Office Action dated January 23, 2004 and affirmed the rejection in the advisory issued on May 25, 2004.

Claim 1 recites, *inter alia*, an encoder generating a continuous, uninterrupted stream of control signal packets which are continuously transmitted, <u>each control signal packet immediately following the preceding packet</u>.

As described above, Rosen teaches a vehicle control system which transmits low duty cycle command bursts containing the vehicle commands. Wood teaches a method and apparatus for collecting and encapsulating ATM cells into the packet structure of a broadband network using larger data packets than the 53 byte structure of the individual ATM cells. Each embodiment of Wood, shown in Figs. 1, 2 and 3, discloses a data packet structure (30 in Fig. 1; 140, 150 in Fig. 2; and 240, 250, 260 in Fig. 3) used by the broadband network that necessarily includes a leader segment 32, 142, 152, 242, 252, 262; a fragment type segment 34, 144, 154, 244, 254, 264; and a payload segment 36, 146, 156, 246, 256, 266, disclosed as 106 bytes in length.

In each embodiment taught by Wood, incoming ATM packets are encapsulated in the payload segment. The additional header information and the fragment type segments precede each payload segment in the transmission of the data packet. Consequently, as would be readily appreciated by one skilled in the art, ATM packets encapsulated in the payload segment of the data packet must, at some point during a transmission, lack the claimed continuity of the transmission both by the interjection of the additional header and the fragment type segments of

the data packet into the data stream and by the need to collect and format at least two consecutive data packets before transporting a packet. Of course, if Rosen transmitted continuously and uninterruptedly as is set forth in Appellants' claim 1, there would be no need to add the step of assembling individual control signal packets, which is the Wood invention.

Claim 1 requires that each control signal packet immediately follow the preceding control packet in time. Wood does not expressly state that the data packets 30, 140, 150, 240, 250 260 immediately follow each other without an intervening gap in time. However, even if the data packets described by Wood are transmitted such that the data packets do immediately follow each other, the ATM packets disclosed by Wood and encapsulated within the payload portion of the data packet, do not directly follow each other in time or order, being separated at least by the additional header and fragment type segments of the data packet. The reasoning of the Examiner in combining Rosen and Wood requires that the claimed control signal packets be substituted for the ATM packets. Since Wood requires the use of the additional header and fragment type segments in each data packet, the transmission of these parts separates the control signal packets in successive data packets. Thus, the combination of Rosen and Wood cited by Examiner is further unsupported on this ground.

2. Patentability of claim 5.

The Examiner states in the Office Action dated August 26, 2003 that the packet size and structure is an obvious matter of design choice that is well within the capabilities of one of ordinary skill in the art and that while Rosen does not teach the claimed arrangement, it would have been obvious for one of ordinary skill in the art at the time of the invention to rearrange the data structure of Rosen in accordance with claims 5-8. Appellants first wish to point out that the packet size and structure recited in claims 5-8 was determined based upon extensive study and understanding of problems related to controlling toy vehicles by the Appellants and is not a mere design choice.

In particular with respect to claim 5, which recites that the number of data bits is equal to eight, Appellants describe in the application at page 1 line 30 to page 3, line 17, problems associated with lengthy transmissions such as susceptibility to radio noise and slow response times. Accordingly, Appellants have designed a control system having a data structure which uses short transmissions. Appellants determined that binary coding of the control information would provide the shortest delay times using simple coding and decoding techniques. As

described at page 5, lines 22-26, Appellants further determined that a total of seven driving commands, seven steering commands and three twist commands for additional toy functions would provide the desired functionality. Appellants further determined that simplicity of decoding demanded that the separate command functions be separately coded as binary coded decimal words utilizing three, three and two bits respectively. Accordingly, the sum of the drive, steering and twist command functions resulted in an eight bit data word in each packet. The number of data bits is different from Rosen, which discloses a 13 bit data word and Wood, which discloses a 53 byte data word. Appellants submit that the selection of eight bits for transmitting the control information was not merely a design choice but the result of careful study and is not taught or suggested or even in the range spanned by Rosen and Wood

3. Patentability of claim 6.

Claim 6 further recites encoding the drive functions with three bits and the steering functions with three bits. As discussed above, Appellants determined that seven driving and seven steering commands were required. Seven states can be represented by three binary bits. One encoding alternative would be to transmit a composite command in which the driving, steering and twist commands were combined. Such an approach requires representation of seventeen states, or five binary bits. However, the complexity of coding and decoding a single 5 bit word outweighs the benefit of a slight reduction in packet length compared to the separate coding of the commands. Further, the number of data bits is different from Rosen, which discloses a six bit steering word and five bit speed word. Appellants submit that the selection of three bits for transmitting the driving and the steering information was not merely a design choice but the result of careful study and is not taught or suggested by either Rosen or Wood.

4. Patentability of claim 7.

Claim 7 further recites encoding the additional toy functions with two bits. As discussed above, the choice of two bits for encoding additional functions was determined by the number of desired additional function capacity and the desire to minimize complexity. Appellants submit that the selection of two bits for transmitting the additional toy functions was not merely a design choice but the result of careful study and is not taught or suggested by either Rosen or Wood.

5. Patentability of claim 8.

Claim 8 further recites using two checksum bits. As described in connection with claim 9 (see below), the selection of a particular checksum algorithm was motivated by the desire to detect all one bit and two bit errors, thus improving the reliability of the information transmissions over the use of a simple parity check with minimal increase in complexity. Appellants submit that the selection of a two bit checksum was not merely a design choice but the result of careful study and is not taught or suggested by either Rosen or Wood.

The claimed data structure departs significantly from the prior art. For example, in the prior art described in the background section of the present application, the data packets transmit information by the number of data bits in the message in contrast to the fixed size number of data bits in the present invention. Rosen, referenced by the Examiner, utilizes asynchronous transmissions having a different number of bits and a different arrangement of the bits, than the synchronous transmission of data packets employed by the present invention.

Appellants submit that the data structure recited in claims 5-8 is not taught or suggested by Rosen or Wood. Further, there would be no reason for one skilled in the art to modify the data structure taught by Rosen to arrive at Appellant's data structure since Rosen's invention does not teach or suggest incorporating additional functions or checksum bits or the synchronous data transmission technique utilized in the present invention. Accordingly, Appellants submit that the combination of Rosen with a design choice does not make claims 5-8 obvious.

6. <u>Patentability of claim 3.</u>

Claim 3 recites that each packet includes 16 bits. "A bit is a contraction of the term binary digit; <u>a unit of information</u> represented by either a zero or a one", <u>IEEE 100, The Authoritative Dictionary of IEEE Standards Terms</u>, Seventh Edition. The Examiner states, in the Office Action dated August 26, 2003 that Rosen discloses at col. 5, lines 58-68, a 16 bit packet consisting of a variable length flag bit followed by 14 bits. Appellants respectively submit that the Examiner has misconstrued the structure of the command bursts disclosed by Rosen by characterizing the "start pulse" disclosed by Rosen as a variable length flag "bit" and by assigning the information carrying capability of two bits to the start pulse disclosed by Rosen.

In the first instance, the start pulse disclosed by Rosen, is a <u>single pulse</u>, the positive going transition of the pulse being utilized by Rosen for initializing a data clock in the receiver for properly sampling the transmitted data bits (see Fig. 4). Such start pulses are utilized in many asynchronous communications systems for synchronizing the receiver clock, including the

widely used Universal Asynchronous Receiver-Transmitter (UART) integrated circuit. Thus, the start pulse disclosed by Rosen conveys at most a single bit of information, that being the start time of the command burst and not two bits of information as suggested by the Examiner.

Further, in order to convey two bits of information in a binary system, a signal must be capable of achieving two independent states in a defined interval. The start pulse described by Rosen is capable of only a single state in the interval defined for the start pulse. Even if the start pulse were construed as a "bit", it could be no more than one bit, Consequently, the maximum number of bits that could be accorded to Rosen's command bursts are 15 bits. Accordingly, Appellants submit that Rosen does not teach or suggest a packet comprising 16 bits, as recited in claim 3.

7. Patentability of claim 4.

Claim 4 recites that the number of flag bits is six. The Examiner states, in the Office Action dated August 26, 2003 that Rosen discloses at col. 5, lines 58-68, a flag bit that is variable, therefore allowing any number of flag bits. Appellants respectively submit that the Examiner has misconstrued the term "variable" to include a variable structure for the start pulse. However, Rosen states that the start pulse "may be slightly variable in length" and not in structure. In order to convey six bits of information there must be a corresponding number of independent states in the signal. Rosen does not teach or suggest that the start pulse may comprise a variable number of flag bits but merely states that the duration of the single start pulse may vary. Accordingly, Appellants submit that Rosen does not teach or suggest a packet including six flag bits.

8. Patentability of claim 9.

Claim 9 recites that the flag bits are at the leading edge of the packet followed by the checksum bits and the data bits. The plain meaning of claim 9 is simply that in the packet structure, the flag bits are transmitted first, followed by the checksum bits and then the data bits. The Examiner states in the Office Action dated August 26, 2003 that Rosen discloses flag bits at the leading edge of a packet where checksum or packet bits are trailing a packet.

The structure recited in claim 9 is different from that described by Rosen in the following respects:

(1) Rosen, as discussed above, does not teach or suggest a plurality of flag bits. Rosen uses a single start pulse to identify to the receiver, the beginning of a packet. The present invention uses six flag bits to identify to the receiver the beginning of a packet and to identify a particular toy (page 5, lines 10-15). The difference in operation is significant because in Rosen's invention, a single noise pulse may trigger the receiver clock to start decoding a false message. In contrast, the six flag bits must match a predetermined code of six bits (i.e. 2^6 states) to start decoding. Thus, even if the start pulse is equated with flag bits, which it is not, both the structure and function of the flag bits are different than the start pulse disclosed by Rosen.

(2) Rosen discloses a single parity bit at the end of the command burst, with the data bits intervening between the parity bit and the start pulse. In contrast, the checksum bits recited in claim 9 immediately follows the flag bits.

(3) Rosen discloses a single parity bit while claim 9 recites a two bit checksum. A parity bit merely indicates whether the number of ones in the data field is odd or even. Thus a parity check will detect only an odd number of bit errors in the data burst, not detecting one half of all possible double errors. A two bit checksum will detect all single and all double errors.

Accordingly, Appellants submit that Rosen does not teach or suggest flag bits followed by the checksum bits and the data bits as recited in claim 9.

9. Patentability of claim 10.

Claim 10 recites that the decoder reads the received control signal at the middle of each transmit element of each bit within the packet. The Examiner states that Rosen likewise reads the control signals in the middle of each transmit element, referring to col. 6, lines 1-24 of Rosen. However, Rosen clearly states that "a window, indicated by a downward pointing arrow (see Fig. 5) is set in the second half of the bit." Accordingly, there is no teaching or suggestion of reading the transmit element at the middle since the use of the word "window" clearly implies a finite time duration extending over at least a portion of the second half of the bit in which the element could be read, a less precise method for determining the value of the transmit element. Further, Appellants have been unable to find in Rosen's application, any disclosure of a clocking mechanism which would allow for the precise reading of a control signal at the middle of each transmit element. Accordingly, Appellants submit that Rosen does not teach or suggest reading a control element in the middle of each transmit element.

10. Patentability of Claim 12

Claim 12 recites that the receiver includes a digital phase locked loop for synchronization of the decoder with the received stream of packets. The Examiner states that Rosen does not teach using a digital phase locked loop but The Art of Electronics (AE) teaches applying digital phase locked loops to wireless devices.

"Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art." *MPEP*, Rev 2, *§ 2143.01,* page 2100-130, May 2004, *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596, 1598, (Fed. Cir. 1988).

There is no teaching or suggestion in Rosen to utilize a digital phase locked loop. Further, there is no teaching or suggestion in AE to utilize a digital phase locked loop for synchronizing the asynchronous data stream taught by Rosen. AE describes on page 641 and at the referenced Fig. 9.67, a standard phase locked loop used to filter a noisy data stream, where the data stream is continuous but may suffer from a small amount of jitter or additive noise. This type of phase locked loop, however, is not suitable for use with the asynchronous data stream generated by Rosen because it does not provide for the required rapid locking of the phase locked loop to the asynchronously generated (variable time) start pulse. Similarly, the phase locked loop described at pages 652 and 653 is directed to a continuous rather than an asynchronous PCM pulse stream.

Rosen and AE are not properly combinable under 35 U.S.C. § 103 as the cited combination would not be operable. AE does not teach or suggest a phase locked loop that is operable with an asynchronous transmission system like that of Rosen. Accordingly, Appellants submit the cited combination of Rosen and AE does not make claim 12 obvious

D. Summary

For the reasons set forth above, Appellant submits: (1) that the Examiner has not met the burden of showing that the claimed invention, taken as a whole, is obvious over the applied references, and (2) that Appellant's claimed invention is indeed novel and unobvious over the applied references and the art of record.

Accordingly, the Examiner's rejections must be REVERSED and claims 1-12 must be allowed.

IX. APPENDIX OF CLAIMS INVOLVED IN THE APPEAL (37 C.F.R. 1.193(c)(9))

1. In a communication system for transmitting control signals from a remote control to a toy vehicle, the remote control including control switches, an encoder and a transmitter, the toy vehicle including a receiver, a decoder and actuators for controlling the operation of the toy vehicle in accordance with control signals received from the remote control, wherein the improvement comprises:

the encoder generating a continuous, uninterrupted stream of control signal packets which are continuously transmitted at a constant frequency, with each control signal packet, other than the first packet, immediately following the preceding packet in time, each of the packets including a predetermined number of biphase encoded bits, each biphase bit being of the same predetermined width with a fifty percent duty cycle including two transmit elements with one binary state being defined as both of the transmit elements of a bit being opposite, each packet including a first predetermined number of flag bits, the states of which are the same for all packets, a second predetermined number of data bits, the states of which vary depending upon the positions of the control switches, and at least one checksum bit.

2. The communication system as recited in claim 1 wherein a binary "zero" is defined as both transmit elements of a bit being the same and a binary "one" is defined as both transmit elements of a bit being opposite.

3. The communication system as recited in claim 1 wherein each packet includes sixteen bits.

4. The communication system as recited in claim 3 wherein the first predetermined number of flag bits is six.

5. The communication system as recited in claim 4 wherein the second predetermined number of data bits is eight.

6. The communication system as recited in claim 5 wherein three of the data bits are for controlling the drive functions of the toy vehicle and three of the data bits are for controlling the steering functions of the toy vehicle.

7. The communication system as recited in claim 6 wherein two of the data bits are for controlling additional toy vehicle functions.

8. The communication system as recited in claim 1 wherein the packet include two checksum bits determined by adding together all of the ones in the data bits and using the lower two bits of the sum.

9. The communication system as recited in claim 1 wherein the flag bits are at the leading edge of each packet and are followed by the checksum bit(s) and the data bits.

10. The communication system as recited in claim 1 wherein the decoder reads the received control signals at the middle of each transmit element of each bit within the packet.

11. The communication system as recited in claim 10 wherein the decoder comprises a microprocessor.

12. The communication system as recited in claim 1 wherein the receiver includes a digital phase-locked loop for synchronization of the decoder with the received stream of packets.

Respectfully submitted,

STEPHEN NICHOLAS WEISS *ET AL.*

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(Date)

LOUIS SICKLES II
Registration No. 45,803
AKIN GUMP STRAUSS HAUER & FELD LLP
One Commerce Square; 2005 Market Street, Suite 2200
Philadelphia, PA 19103-7013
Telephone: 215-965-1200; **Direct Dial: 215-965-1294**
Facsimile: 215-965-1210
E-Mail: lsickles@akingump.com

LS:JJ/lcd/vbm

Enclosures